REMARKS/ARGUMENTS

1.   Claims 1-35 are Patentable Over the Cited Art

        The Examiner rejected claims 1-35 as obvious (35 U.S.C. §103) over Worrell (U.S.
patent No. 5,773,709). Applicants traverse.

        Claims 1, 13, and 24 require: accessing a program comprising a plurality of instructions
including at least one no operation (NOP) instruction; determining one instruction in the program
preceding a determined NOP instruction whose movement forward to replace the determined
NOP instruction will not result in data not being available when needed; and replacing the
determined NOP instruction with the determined instruction preceding the determined NOP
instruction.

        The Examiner recognized that Worrell does not disclose determining one instruction in
the program preceding a determined NOP instruction whose movement forward to replace the
determined NOP instruction will not result in data not being available when needed; and
replacing the determined NOP instruction with the determined instruction preceding the
determined NOP instruction.   (Final Office Action, pg. 3)

        However, the Examiner found that these claim requirements are obvious because both
Worrell and Applicant's invention provide the optimizing instruction sequences by deleting NOP
instructions. The Examiner found that either replacing the NOP instruction with a determined
instruction preceding the NOP instruction (as claimed) or replacing the determined OP
instruction with the target instruction following the determined NOP instruction both provide the
same result. (Final Office Action, pg. 3).

        Applicants traverse this finding because the result of the cited Worrell and claimed
invention are not the same. Worrell nowhere teaches or mentions the claimed operation and
result of determining one instruction in the program preceding a determined NOP instruction
whose movement forward to replace the determined NOP instruction will not result in data not
being available when needed; and then moving that determined NOP instruction forward. Thus,
the cited Worrell does not result in the replacing of an NOP instruction by moving a determined
instruction forward as claimed.   Instead, Worrell describes a different set of operations for
replacing an NOP instruction than the process described Worrell.

The Examiner cited cols. 4-5 of Worrell with respect to these claims. (Final Office Action, pg. 3)

Worrell mentions replacing an NOP instruction for an instruction sequence on the left is replaced by the target instruction itself. The new target instruction for the branch instruction is the instruction following the previous target instruction. (Worrell, col. 4, lines 55-67) Worrell further mentions substituting a conditional branch instruction followed by an NOP instruction with a branch likely instruction with the target instruction replacing the new NOP instruction. (Worrell, col. 5, lines 1-50)

Applicants submit that the Examiner has not cited any part of Worrell that teaches or suggests moving an instruction forward to replace an NOP instruction whose movement forward will not result in data not being available when needed. Instead, the cited Worrrell discusses replacing a conditional branch followed by an NOP instruction with a branch likely and moving the target of the branch to the NOP.

The result of the claimed NOP replacement operation and Worrell are very different because Worrell discusses replacing a conditional branch followed by an NOP with a branch likely and moving the target of the branch to the NOP. This cited NOP replacement operation is different and does not teach or suggest the requirements of moving an instruction forward to replace the NOP when determining that moving the instruction forward will not result in data not being available when needed.

Further, when the cited Worrell discusses replacing an instruction on the left with a sequence on the right, Worrell is referring to the instructions as presented in the tables in the Specification, i.e., the instruction shown on the left and the right of the table.

The Examiner found that one would have been motivated to modify Worrell's approach to allow replacing NOP instruction with a non-NOP instruction preceding the NOP instruction because both remove unwanted NOP instruction to optimize instruction sequences. (Final Office Action, pgs. 3-4) The claims require a specific technique for replacing an NOP instruction that is not taught or suggested in Worrell.

Although both Worrell and the claims at one level may concern replacing an NOP instruction, the claims provide a different approach than that in Worrell, where the claims involve moving an instruction forward to replace the NOP when determining that moving the instruction forward will not result in data not being available when needed. The Examiner has

not explained how a general motivation to a replace an NOP instruction would teach or suggest to one skilled in the art the specific claimed technique for removing an NOP instruction. Instead, the cited Worrell discusses different approaches from the claimed technique.

Accordingly, claims 1, 13, and 24 are patentable over the cited art because the cited Worrell does not teach or suggest all the claim requirements.

Claims 2-12, 14-23 and 25-34 are patentable over the cited art because they depend from one of claims 1, 13, and 34. Further, the below discussed claims provide additional grounds of patentability over the cited art.

Claims 3, 15, and 26 depend from claims 1, 13, and 24, respectively, and further require deleting at least one instruction in the program that is not needed to provide the processing delay to ensure the data is available to at least one dependent instruction; and after deleting the at least one instruction, replacing at least one NOP instruction with one determined instruction whose movement forward to replace the determined NOP instruction will not result in data not being available when needed.

The Examiner cited the above discussed cols. 4-5 of Worrell as disclosing the additional requirements of these claims. (Final Office Action, pg. 4) Applicants traverse.

The cited Worrell discusses replacing a conditional branch followed by an NOP instruction with a branch likely and moving the target of the branch to the NOP. This does not teach or suggest that after deleting an NOP instruction, the NOP instruction is replaced with the determined instruction whose movement forward will not result in data not being available when needed.

Accordingly, claims 3, 15, and 26 provide additional grounds of patentability over the cited art because the additional requirements of these claims are not taught in the cited Worrell.

Claims 6, 18, and 29 depend from claims 2, 14, and 25 and additionally require that deleting NOP instructions in the program further comprises accessing and processing each NOP instruction by: determining whether the accessed NOP instruction is needed to delay processing of one dependent instruction following the accessed NOP instruction to ensure that data is available to the dependent instruction accessing the data; and deleting the accessed NOP instruction in response to determining that the NOP instruction is not needed to ensure that data is available to the dependent instruction accessing the data..

The Examiner cited col. 3, lines 20-25 of Worrell with respect to these claim requirements. (Final Office Action, pg. 5)

The cited col. 3 mentions optimizing instruction sequences to avoid NOP instructions in a branch delay slot. Thus optimized computer programs can be coded with a branch instruction immediately following another branch instruction yielding higher performance. This cited general goal concerning avoiding NOP instructions and using branch instructions does not teach or suggest the claim requirements of accessing and processing each NOP instruction by: determining whether the accessed NOP instruction is needed to delay processing of one dependent instruction following the accessed NOP instruction to ensure that data is available to the dependent instruction accessing the data. Further, the cited cols. 4-5 of Worrell discuss substituting a conditional branch instruction followed by a NOP instruction with a branch likely instruction with the target instruction replacing the new NOP instruction. This does not teach deleting an instruction as claimed.

Accordingly, claims 6, 18, and 29 provide additional grounds of patentability over the cited art because the additional requirements of these claims are not taught in the cited Worrell.

Claims 8, 20, and 31 depend from claims 1, 13, and 24, respectively, and further require that the determining of one instruction in the program to move forward comprises determining one instruction whose movement forward to replace the determined NOP instruction will not result in data not being available to one dependent instruction following the NOP instruction.

The Examiner referenced the findings with respect to claim 1 as teaching the requirements of these claims. (Final Office Action, pg. 6)

Applicants submit that the cited Worrell does not teach or suggest the claim requirement of a determination of an instruction to move forward whose movement forward will not result in data not being available to one dependent instruction following the NOP instruction. Instead, the cited cols. 4-5 of Worrell discuss substituting a conditional branch instruction followed by an NOP instruction with a branch likely instruction with the target instruction replacing the new NOP instruction. This does not teach determining an instruction to move forward as claimed.

Accordingly, claims 8, 20, and 31 provide additional grounds of patentability over the cited art because the additional requirements of these claims are not taught in the cited Worrell.

Claims 10, 22, and 33 depend from claims 8, 20, and 31 and further require deleting at least one NOP instruction not needed to ensure that data accessed by the dependent instruction is

available to the dependent instruction, wherein the operations of replacing accessed NOP instructions with previous non-NOP instructions are performed after deleting NOP instructions not needed to ensure that data accessed by the dependent instruction is available.

The Examiner cited the above discussed cols. 4-5 of Worrell as disclosing the additional requirements of these claims. (Final Office Action, pgs. 7) Applicants traverse.

The cited Worrell discusses replacing a conditional branch followed by an NOP instruction with a branch likely and moving the target of the branch to the NOP. This does not teach that after deleting an NOP instruction, the NOP instruction is replaced with the determined instruction whose movement forward will not result in data not being available when needed.

Accordingly, claims 10, 22, and 33 provide additional grounds of patentability over the cited art because the additional requirements of these claims are not taught or suggested in the cited Worrell.

2.   Added claim 36 is Patentable Over the Cited Art

Added claim 36 depends on claim 1and further recites that determining one instruction in the program preceding the determined NOP instruction whose movement forward to replace the determined NOP instruction will not result in data not being available when needed comprises determining whether the instruction to move forward causes the data needed by one dependent instruction to be written in fewer cycles such that the number of cycles between a writing instruction and the dependent instruction are not sufficient to guarantee that the written data will be available to the dependent instruction.

These added requirements are disclosed on at least para. 11 on pgs. 4-5 of the Specification.

Applicants submit that claim 36 is patentable over the cited art because it depends from claim 1, which is patentable over the cited art for the reasons discussed above, and because the additional requirements of these claims in combination with the base claims provide further grounds of patentability over the cited art.

Conclusion

For all the above reasons, Applicant submits that the pending claims 1-36 are patentable. Should any additional fees be required beyond those paid, please charge Deposit Account No. 50-0585.

The attorney of record invites the Examiner to contact him at (310) 553-7977 if the Examiner believes such contact would advance the prosecution of the case.

Dated: January 31, 2008   By:_____/David Victor/_____

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